

REMARKS

The Examiner is thanked for the due consideration given the application.

Claims 1, 10-21 and 25-28 are pending in the application. Claims 25-28 are newly presented. Support for new claim 25 can be found in the specification at page 8, line 13. New independent claim 26 generally sets forth subject matter from claims 1 and 25. New claim 27 generally sets forth subject matter from claim 21. New independent claim 28 generally sets forth subject matter from claims 1, 21 and 25.

No new matter is believed to be added to the application by this amendment.

Objection to the Disclosure

The disclosure is objected to as containing informalities. The Official Action asserts that the specification at page 8, lines 12-13 teach that $x+y+z=1$ in one embodiment and that the specification also teaches that that $z+y+Z$ need not be equal to 1.

First, it is noted that $x+y+z=1$ is now explicitly set forth in the claims.

However, this embodiment of the present invention is part of a set of conditions pertaining to stoichiometry, morphology and phase structure. It is thus clear that a relationship of x , y and z (such as $x+y+z=1$) is meant that satisfies these conditions.

It is thus believed that the disclosure is free from informalities.

Claim Objections

Claim 21 has been objected to as failing to further limit the subject matter of a previous claim.

The Official Action asserts that claim 21 sets forth a morphotropic tetragonal rhomboidrical phase boundary, but this structure would be inherent in base claim 1.

However, from the phase diagram of PZT, is clear that not every PZT inherently has a morphotropic tetragonal rhomboidrical phase boundary. This is evidenced by the diagrams (reproduced below) set forth in Chapter 7 of Jaffe (Piezoelectric Ceramics), which was submitted with the Amendment filed July 14, 2008.

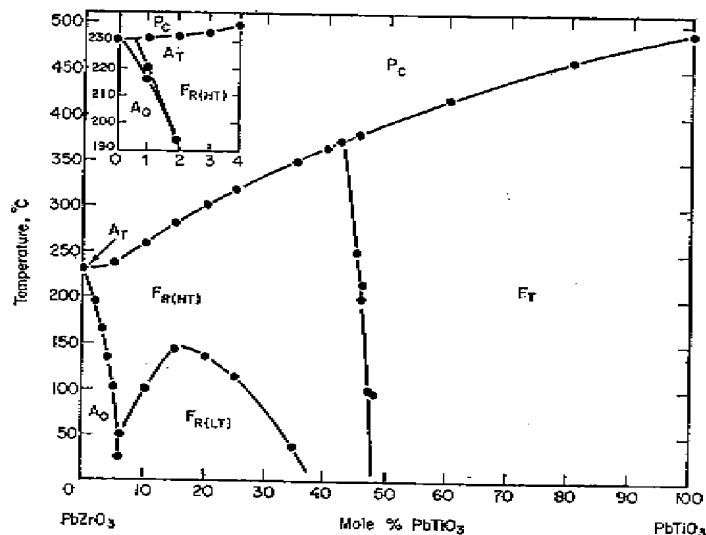


Fig. 7.1. PbTiO_3 - PbZrO_3 sub-solidus phase diagram.

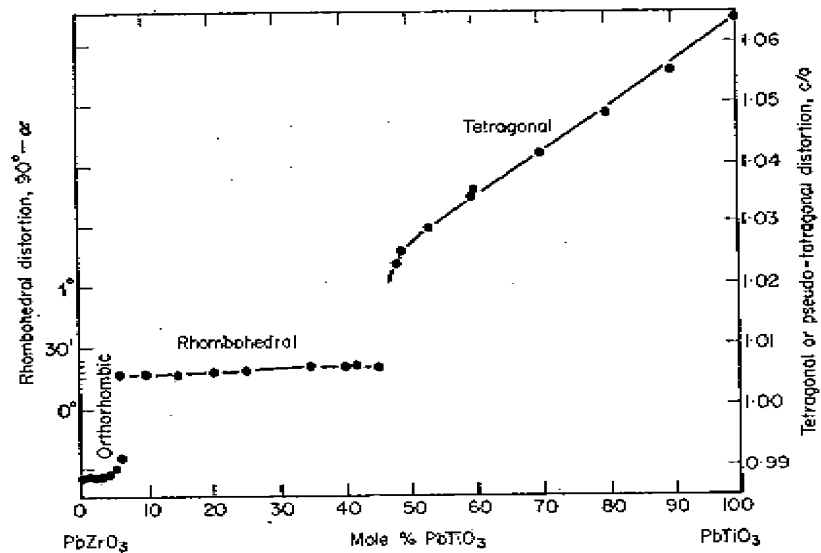


FIG. 7.2. Unit cell distortion at room temperature for the PbTiO₃-PbZrO₃ system.

As can be seen from the phase diagram of PZT, not every PZT has a morphotropic rhomboidrical phase boundary.

Accordingly, claim 21 clearly further limits claim 1.

Rejection Under 35 USC §112, First Paragraph

Claims 1, 12 and 13 have been rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

Concerning claims 12 and 13, the limitation and the amount of palladium ranges from 0 mol% to 30 mol% is clearly disclosed.

Concerning the issue with the index "a", on page 3 of the specification it is clearly mentioned that that ion radius of the rare earth metal is such that the rare earth metals can

replace lead on the A-sides of the PZTs. Therefore, it clearly follows that a must be greater than 0 in the formula $Pb_{1-a}RE_bZr_xTi_yTR_zO_3$.

Also, since the index "b" is defined, the maximum value of z is defined too.

As a result, the claims are in full compliance with the written description requirement.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Under 35 USC §112, Second Paragraph

Claims 1, 3-6 and 10-21 have been rejected under 35 USC §112, second paragraph, as being indefinite. This rejection is respectfully traversed.

The Official Action asserts that the variables a , x , y and z are not defined in claim 1. However, claim 1 clearly sets forth these variables, stating: *"where a , x and y are each greater than 0, b is a rare earth metal proportion and z is a transition metal proportion."* Further it is noted that x , y and z can be further defined as $x+y+z=1$, such as is set forth in new claims 25, 26 and 28.

The claims are thus clear, definite and have full antecedent basis.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Conclusion

The objections and rejections are believed to have been overcome, obviated or rendered moot, and that no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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